

In the Office Action, Claims 27, 29/27, 30/27, 40, 42/40, and 43/40 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. In particular, the Office Action states that the phrase “the light source” lacks antecedent basis in Claims 27 and 40. Without conceding the propriety of this rejection, Claims 27 and 40 have been amended to change “the light source” to “the laser source”. Since there is proper antecedent basis in Claims 18 and 31 (from which Claims 27 and 40 depend, respectively) for “the laser source”, it is believed that the Section 112 rejection has been overcome, and its withdrawal is therefore respectfully requested.

Claims 18, 19, 21, 22, 24, 25, 29/18, 29/19, 29/21, 29/22, 29/24, 29/25, 30/18, 30/19, 30/21, 30/22, 30/24, 30/25, 31, 32, 34, 35, 37, 38, 42/31, 42/32, 42/34, 42/35, 42/37, 42/38, 43/31, 43/32, 43/34, 43/35, 43/37, and 43/38 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent 4,355,859 (Herloski et al.).

As amended, independent Claim 18 is directed to an optical scanning apparatus comprising a laser unit having a laser source and an optical element configured to emit a substantially parallel beam of light, an incident optical system arranged to direct the light beam emerging from the laser unit to strike an optical deflector while maintaining a width of the light beam wider than a width of a deflecting surface of the optical deflector in a main scanning direction, and an imaging optical system for forming the light beam deflected by the optical deflector into an image on a scanned surface. The laser unit is adapted to be shifted in a predetermined direction with respect to an optical axis of the incident optical system.

In Applicants' view, Herloski et al. is not seen to teach or suggest using an Over Field Scanner (OFS) or Under Field Scanning (UFS) optical system, and also does not appear to be concerned with a need to address the technical problems inherent in OFS systems, as is Applicants' invention (see page 2, lines 5-12 of the specification). Fig. 4 of Herloski et al. shows a laser adjusting mechanism for adjusting an optical axis of a condensing lens 67 and an inclination of a laser 25 so as to be coincident. Herloski et al. merely shows prior art which is similar to that discussed from page 2, line 22 to page 3, line 9 of the present application. In Fig. 3B of the present application, the laser 2 preferably is tilted or shifted to the lens 3.

In Herloski et al., the mechanism for tilting the laser is more complicated as compared with shifting, thus resulting in higher costs. For shifting the laser, a parallel optical flux is obliquely emitted so that scanning efficiency may be degraded and focus deviation may occur on the scanned plane.

In contradistinction to Herloski et al., according to an embodiment of Applicants' invention, the laser 2 and the lens 3 (Fig. 3B) are shifted by a same amount in a same direction as the laser 2 is tilted in Fig. 3C if the laser 2 is tilted so as to resolve the problems discussed at page 2, line 22 to page 3, line 9 of the specification. The laser 2 may be tilted to an optical axis of a collimator lens 3 and a light emitting point of the laser element 2 may be substantially coincident with the optical axis of the collimator lens 3 to emit the parallel optical flux.

The Office Action alleges that in Herloski et al., "A laser assembly from the raster scanner can be pivoted so as to align with the axis of the laser beam 25 with the

optical axis of the scanner“, “Lens 45, mirror 33, mirror 30, mirror 47, and slot-like aperture 49 read on the instant invention’s imaging optical system”, and “The shifting direction is shown with arrows in Fig. 3 which reads on the predetermined direction with respect to the optical axis of the incident optical system.” However, according to Applicants’ understanding, in Herloski et al. the laser assembly 15 merely provides a beam along a scanner optical path O leading from a beam discharge end thereof to a first beam folding mirror 24 mounted on an end support 18 adjacent the laser output (see, e.g., col. 3, lines 41-44 and Fig. 3). Nothing has been found, or pointed out, in Herloski et al. that would teach or suggest an optical scanning apparatus comprising *a laser unit having a laser source and an optical element configured to emit a substantially parallel beam of light*, an incident optical system arranged to direct the light beam emerging from the laser unit to strike an optical deflector while maintaining a width of the light beam wider than a width of a deflecting surface of the optical deflector in a main scanning direction, and an imaging optical system for forming the light beam deflected by the optical deflector into an image on a scanned surface, *wherein the laser unit is adapted to be shifted in a predetermined direction with respect to an optical axis of the incident optical system*, as recited in Claim 18.

Accordingly, Claim 18 is deemed clearly patentable over Herloski et al..

Independent Claim 31 recites features that are similar to those discussed above with respect to Claim 18, and therefore also is believed to be patentable over Herloski et al. for the same reasons as those discussed above.

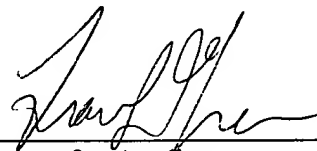
A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as a reference against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

18. (Amended) An optical scanning apparatus comprising:
a laser unit having a laser source and [being] an optical element configured to emit
a substantially parallel beam of light;
an incident optical system arranged to direct the light beam emerging from the
laser unit to strike an optical deflector while maintaining a width of the light beam wider than a
width of a deflecting surface of the optical deflector in a main scanning direction; and
an imaging optical system for forming the light beam deflected by the optical
deflector into an image on a scanned surface,
wherein said laser unit is adapted to be shifted in a predetermined direction with
respect to an optical axis of said incident optical system.

27. (Amended) An apparatus according to claim 18, wherein a tilt angle of
the [light] laser source in the main scanning direction is set to not more than $\pm 2.5^\circ$ with respect to
the optical axis of the laser unit.

31. (Amended) A method for performing optical scanning using an optical
scanning apparatus including a laser unit having a laser source and [being] an optical element
configured to emit a substantially parallel beam of light, an incident optical system arranged to
direct the light beam emerging from the laser unit to strike an optical deflector while maintaining a

width of the light beam wider than a width of a deflecting surface of the optical deflector in a main scanning direction, and an imaging optical system for forming the light beam deflected by the optical deflector into an image on a scanned surface, the method comprising the step of:

shifting the laser unit in a predetermined direction with respect to an optical axis of the incident optical system.

40. (Amended) The method according to claim 31, wherein a tilt angle of the [light] laser source in the main scanning direction is set to not more than $\pm 2.5^\circ$ with respect to the optical axis of the laser unit.